AMENDMENTS TO THE CLAIMS

This listing of claims will replace all prior versions, and listings, of claims in the application:

Listing of Claims:

1. (currently amended) An integrated optical device, comprising:

an optical component having an optical wavelength response that is a function of temperature of the optical component, the optical component comprising an interferometric optical filter comprising multiple optical paths of unequal lengths, the interferometric optical filter comprising an arrayed waveguide grating;

a heating element disposed in proximity to the optical component to be capable of inducing temperature elevation of the optical component;

a temperature-sensing element capable of generating indications of temperature at location of the temperature-sensing element, wherein temperature elevations induced at the location by the heating element exceed corresponding temperature elevations induced in at least one region of the optical device by the heating element; and

a temperature controller coupled to the heating element and to the temperature-sensing element to receive the indications of temperature and to set power dissipated in the heating element based on the indications of temperature received from the temperature-sensing element so as to drive the optical wavelength response to a predetermined wavelength, wherein:

indications of temperature generated by the temperature-sensing element during stable thermal state of the optical device vary as a first substantially linear function of the power dissipated in the heating element;

effective temperature of the optical component during stable thermal state varies as a second substantially linear function of the power dissipated in the heating element;

the first substantially linear function is characterized by a first thermal constant $(\frac{dT_r}{dW})$ that is the rate of increase in the indications of temperature with the power dissipated in the heating element;

the second substantially linear function is characterized by a second thermal constant $(\frac{dT_\lambda}{dW})$ that is the rate of change in the optical wavelength response with the power dissipated in the heating element;

the temperature controller is capable of estimating global temperature (T_e) of the optical component during a first period based on (i) one or more temperature indications received from the temperature-sensing element during the first period, (ii) the power dissipated by the heating element during the first period, and (iii) the first thermal constant;

the optical wavelength response of the optical component is substantially equal to the predetermined wavelength at a first effective temperature of the optical component; and

the temperature controller is capable of determining a set-point to which the temperature controller drives temperature indications of the temperature-sensing element during a second period that follows the first period by

computing a difference between the first effective temperature and the estimate of the global temperature of the optical component during the first period,

computing a ratio of the first thermal constant to the second thermal constant,

computing a product of the difference and the ratio, and

adding the product to the estimate of the global temperature of the optical component during the first period to obtain the set-point.

2. (currently amended) An integrated optical device according to claim 1, wherein:

~~indications of temperature generated by the temperature-sensing element during stable thermal state of the optical device vary as a first substantially linear function of the power dissipated in the heating element; and~~

~~effective temperature of the optical component during stable thermal state varies as a second substantially linear function of the power dissipated in the heating element~~ the temperature controller comprises a proportional-integral-derivative temperature controller.

3. (currently amended) An integrated optical device according to claim ~~2, wherein the optical component comprises an interferometric optical filter comprising multiple optical paths of unequal lengths~~ 1, wherein the temperature sensing element comprises a resistance temperature device.

4. (currently amended) An integrated optical device according to claim 3, wherein ~~the interferometric optical filter comprises an arrayed waveguide grating~~ the temperature controller performs an iterative adjustment of the power dissipated in

the heating element to drive the optical wavelength response to the predetermined wavelength.

5. (currently amended) An integrated optical device according to claim [[4]] 1 , wherein the heating element comprises an efficient patterned heater.

6. (original) An integrated optical device according to claim 5, wherein the temperature sensing element comprises a resistance temperature device.

7. (currently amended) An integrated optical device according to claim [[4]] 1 , wherein the temperature controller performs an iterative adjustment of the power dissipated in the heating element to drive the optical wavelength response to the predetermined wavelength.

8. (currently amended) An integrated optical device according to claim [[4]] 2 , wherein:

duration of the first period is of the order of a thermal time constant characterizing propagation of changes in the power dissipated in the heating element to changes in the optical wavelength response ~~the first substantially linear function is characterized by a first thermal constant~~ $\cancel{(\frac{dT_r}{dW})}$ ~~that is the rate of increase in the indications of temperature with the power dissipated in the heating element;~~

~~the second substantially linear function is characterized by a second thermal constant~~ $\cancel{(\frac{dT_\lambda}{dW})}$ ~~that is the rate of change in the optical wavelength response with the power dissipated in the heating element;~~

~~the temperature controller is capable of estimating global temperature~~ $\cancel{(T_e)}$ ~~of the optical component during a first period based on (i) one or more temperature indications received from the temperature sensing element during~~

~~the first period, (ii) the power dissipated by the heating element during the first period, and (iii) the first thermal constant;~~

~~the optical wavelength response of the optical component is substantially equal to the predetermined wavelength at a first effective temperature of the optical component; and~~

~~the temperature controller is capable of determining a set-point to which the temperature controller drives temperature indications of the temperature-sensing element during a second period that follows the first period by~~

> ~~computing a difference between the first effective temperature and the estimate of the global temperature of the optical component during the first period,~~
>
> ~~computing a ratio of the first thermal constant to the second thermal constant,~~
>
> ~~computing a product of the difference and the ratio, and~~
>
> ~~adding the product to the estimate of the global temperature of the optical component during the first period to obtain the set-point~~.

9. (currently amended) An integrated optical device according to claim [[8]] 1 , wherein duration of the first period is of the order of a thermal time constant characterizing propagation of changes in the power dissipated in the heating element to changes in the optical wavelength response.

10. (currently amended) An integrated optical device according to claim [[8]] 1 , wherein duration of the first period is greater than a thermal time constant characterizing propagation of changes in the power dissipated in the heating to changes in the optical wavelength response.

11. (currently amended) An integrated optical device according to claim [[4]] 1 , wherein:

the heating element comprises a heater active portion that dissipates substantially all of the power dissipated by the heating element;

the temperature-sensing element comprises a sensor active portion with resistance that varies as a function of temperature; and

the heater and sensor active portions are made from the same material.

12. (currently amended) An integrated optical device according to claim [[4]] 1 , wherein the temperature-sensing element comprises a first patterned thin conductive film disposed on the arrayed waveguide grating.

13. (original) An integrated optical device according to claim 12, wherein the heating element comprises a second patterned thin conductive film disposed on the arrayed waveguide grating.

14. (currently amended) An integrated optical device according to claim [[4]] 1 , wherein the heating element comprises a patterned thin conductive film disposed on the arrayed waveguide grating.

15. (currently amended) An integrated optical device according to claim [[4]] 1 , wherein the temperature controller is capable of determining a set-point to which the temperature controller drives temperature indications of the temperature-sensing element using analog processing.

16. (currently amended) An integrated optical device, comprising:

a first optical component having a first optical wavelength response that is a function of temperature of the first optical component, the first optical component comprising a first arrayed waveguide grating;

a first heating element disposed in proximity to the first optical component to be capable of inducing temperature elevation of the first optical component, the first heating element comprising an efficient patterned heater;

a first temperature-sensing element capable of generating indications of temperature at a first location of the first temperature-sensing element, wherein temperature elevations induced at the first location by the first heating element exceed corresponding temperature elevations induced by the heating element in a first region remote from the first location of the optical device;

a first temperature controller coupled to the first heating element and to the first temperature-sensing element to receive the indications of temperature from the first temperature-sensing element and to set power dissipated in the first heating element based on the indications of temperature received from the first temperature-sensing element so as to drive the first optical wavelength response to a first predetermined wavelength;

a second optical component having a second optical wavelength response that is a function of temperature of the second optical component, the second optical component comprising a second arrayed waveguide grating; ~~and~~

a second heating element disposed in proximity to the second optical component to be capable of inducing temperature elevation of the second optical component, wherein

a second temperature-sensing element capable of generating indications of temperature at a second location of the second temperature-sensing element, wherein temperature elevation induced by the second heating element at the second location exceeds corresponding temperature elevations induced by the second heating element in a second region of the optical device; and

a second temperature controller coupled to the second heating element and to the second temperature-sensing element to receive the indications of

temperature from the second temperature-sensing element and to set power dissipated the second heating element based on the indications of temperature received from the second temperature-sensing element so as to drive the second optical wavelength response to a second predetermined wavelength, wherein

indications of temperature generated by the first temperature-sensing element during stable thermal state vary as a first substantially linear function of the power dissipated in the first heating element;

effective temperature of the first optical component during stable thermal state varies as a second substantially linear function of the power dissipated in the first heating element;

indications of temperature generated by the second temperature-sensing element during stable thermal state vary as a third substantially linear function of the power dissipated in the second heating element; and

effective temperature of the second optical component varies as a fourth substantially linear function of the power dissipated in the second heating element;

the first substantially linear function is characterized by a first thermal constant that is the rate of increase in the indications of temperature generated by the first temperature-sensing element with the power dissipated in the first heating element;

the second substantially linear function is characterized by a second thermal constant that is the rate of change in the effective temperature of the first optical wavelength response with the power dissipated in the first heating element;

the first temperature controller is capable of estimating global temperature of the first optical component during a first period based on (i) one or more

temperature indications received from the first temperature-sensing element during the first period, (ii) the power dissipated by the first heating element during the first period, and (iii) the first thermal constant;

the first optical wavelength response is substantially equal to the first predetermined wavelength at a first effective temperature of the first optical component; and

the first temperature controller is capable of determining a set-point to which the first temperature controller drives temperature indications generated by the first temperature-sensing element during a second period that follows the first period by

computing a difference between the first effective temperature and the estimate of the global temperature of the first optical component during the first period,

computing a ratio of the first thermal constant to the second thermal constant,

computing a product of the difference and the ratio, and

adding the product to the estimate of the global temperature of the first optical component during the first period to obtain the set-point.

17. (currently amended) An integrated optical device according to claim 16, wherein the temperature controller comprises a proportional-integral-derivative temperature controller ~~further comprising:~~

~~a second temperature-sensing element capable of generating indications of temperature at a second location of the second temperature-sensing element, wherein temperature elevation induced by the second heating element at the~~

~~second location exceeds corresponding temperature elevations induced by the second heating element in a second region of the optical device; and~~

~~a second temperature controller coupled to the second heating element and to the second temperature-sensing element to receive the indications of temperature from the second temperature-sensing element and to set power dissipated the second heating element based on the indications of temperature received from the second temperature-sensing element so as to drive the second optical wavelength response to a second predetermined wavelength~~.

18. (currently amended) An integrated optical device according to claim 17, wherein the heating element comprises a patterned thin conductive film disposed on the arrayed waveguide grating

~~indications of temperature generated by the first temperature-sensing element during stable thermal state vary as a first substantially linear function of the power dissipated in the first heating element;~~

~~effective temperature of the first optical component during stable thermal state varies as a second substantially linear function of the power dissipated in the first heating element;~~

~~indications of temperature generated by the second temperature-sensing element during stable thermal state vary as a third substantially linear function of the power dissipated in the second heating element; and~~

~~effective temperature of the second optical component varies as a fourth substantially linear function of the power dissipated in the second heating element~~.

19. (currently amended) An integrated optical device according to claim 18, wherein the temperature-sensing element comprises a first patterned thin

conductive film disposed on the arrayed waveguide grating ~~the first optical component comprises a first arrayed waveguide grating~~.

20. (currently amended) An integrated optical device according to claim 19, wherein the temperature controller comprises a proportional-integral-derivative temperature controller ~~the second optical component comprises a second arrayed waveguide grating~~.

21. (currently amended) An integrated optical device according to claim [[20]] 16 , wherein the first predetermined wavelength is equal to the second predetermined wavelength.

22. (currently amended) An integrated optical device according to claim 19, wherein the temperature controller performs an iterative adjustment of the power dissipated in the heating element to drive the optical wavelength response to the predetermined wavelength ~~the first heating element comprises an efficient patterned heater~~.

23. (currently amended) An integrated optical device according to claim 22, wherein:

the heating element comprises an efficient patterned heater ~~the first substantially linear function is characterized by a first thermal constant that is the rate of increase in the indications of temperature generated by the first temperature-sensing element with the power dissipated in the first heating element;~~

~~the second substantially linear function is characterized by a second thermal constant that is the rate of change in the effective temperature of the first optical wavelength response with the power dissipated in the first heating element;~~

~~the first temperature controller is capable of estimating global temperature of the first optical component during a first period based on (i) one or more temperature indications received from the first temperature-sensing element during the first period, (ii) the power dissipated by the first heating element during the first period, and (iii) the first thermal constant;~~

~~the first optical wavelength response is substantially equal to the first predetermined wavelength at a first effective temperature of the first optical component;~~

~~the first temperature controller is capable of determining a set-point to which the first temperature controller drives temperature indications generated by the first temperature-sensing element during a second period that follows the first period by~~

~~computing a difference between the first effective temperature and the estimate of the global temperature of the first optical component during the first period,~~

~~computing a ratio of the first thermal constant to the second thermal constant,~~

~~computing a product of the difference and the ratio, and~~

~~adding the product to the estimate of the global temperature of the first optical component during the first period to obtain the set-point~~.

24. (currently amended) <u>An integrated optical device, comprising:</u>

<u>a first optical component having a first optical wavelength response that is a function of temperature of the first optical component;</u>

a first heating element disposed in proximity to the first optical component to be capable of inducing temperature elevation of the first optical component;

a first temperature-sensing element capable of generating indications of temperature at a first location of the first temperature-sensing element, wherein temperature elevations induced at the first location by the first heating element exceed corresponding temperature elevations induced by the heating element in a first region remote from the first location of the optical device;

a first temperature controller coupled to the first heating element and to the first temperature-sensing element to receive the indications of temperature from the first temperature-sensing element and to set power dissipated in the first heating element based on the indications of temperature received from the first temperature-sensing element so as to drive the first optical wavelength response to a first predetermined wavelength;

a second optical component having a second optical wavelength response that is a function of temperature of the second optical component; and

a second heating element disposed in proximity to the second optical component to be capable of inducing temperature elevation of the second optical component ~~An integrated optical device according to claim 16~~, wherein:

indications of temperature generated by the first temperature-sensing element during stable thermal state vary as a first substantially linear function of the power dissipated in the first heating element, the first substantially linear function being characterized by a first thermal constant that is the rate of change in the indications of temperature generated by the first temperature-sensing element with the power dissipated in the first heating element;

effective temperature of the first optical component during stable thermal state varies as a second substantially linear function of the power dissipated in the first heating element, the second substantially linear function

being characterized by a second thermal constant that is the rate of change in the effective temperature of the first optical component with the power dissipated in the first heating element;

effective temperature of the second optical component during stable thermal state varies as a third substantially linear function of the power dissipated in the second heating element, the third substantially linear function being characterized by a third thermal constant that is the rate of change in the effective temperature of the second optical component with the power dissipated in the second heating element;

the first temperature controller is capable of estimating global temperature of the first optical component during a first period based at least in part on (i) one or more temperature indications received from the first temperature-sensing element, (ii) the power dissipated by the first heating element, and (iii) the first thermal constant;

the first optical wavelength response is substantially equal to the first predetermined wavelength at a first effective temperature of the first optical component;

the second optical wavelength response is substantially equal to the second predetermined wavelength at a second effective temperature of the second optical component;

the first temperature controller is capable of determining a first set-point to which the first temperature controller drives temperature indications generated by the first temperature-sensing element during a second period that follows the first period by

computing a first difference between the first effective temperature and the estimate of the global temperature,

computing a ratio of the first thermal constant to the second thermal constant,

computing a first product of the first difference and the ratio, and

adding the first product to the estimate of the global temperature to obtain the first set-point; and

the first temperature controller is capable of determining a second set-point to which the first temperature controller sets the power dissipated in the second heating element by

computing a second product of the second thermal constant and the power dissipated in the first heating element,

computing a second difference by subtracting the second effective temperature from the second effective temperature,

computing a sum by adding the second product to the second difference, and

dividing the sum by the third thermal constant to obtain the second set-point.

25. (original) An integrated optical device in accordance with claim 24, wherein the first heating element comprises a first efficient patterned heater, the second heating element comprises a second efficient patterned heater, the first optical component comprises a first arrayed waveguide grating, and the second optical component comprises a second arrayed waveguide grating.

26. (original) An integrated optical device in accordance with claim 24, wherein the first predetermined wavelength is equal to the second predetermined wavelength.

27. (original) An integrated optical device in accordance with claim 25, wherein the first heating element comprises a first patterned conductive thin film of a first material disposed on the first arrayed waveguide grating.

28. (original) An integrated optical device in accordance with claim 27, wherein the first temperature-sensing element comprises a second patterned conductive thin film of the first material disposed proximally to the first arrayed waveguide grating.

29. (currently amended) A method for temperature-stabilizing an optical component of an optical device, the optical component having an optical wavelength response that is a function of temperature of the optical component, the method comprising:

providing a heating element disposed on the optical device in proximity to the optical component, the heating element being capable of inducing temperature elevation of the optical component;

providing a temperature-sensing element on the optical device, wherein the temperature-sensing element is capable of generating indications of temperature at location of the temperature-sensing element, wherein temperature elevations induced by the heating element at the location exceed corresponding temperature elevations induced by the heating element in at least one region of the optical device;

providing a temperature controller coupled to the heating element and to the temperature-sensing element to receive the indications of temperature and to set power dissipated in the heating element based on the indications of temperature received from the temperature-sensing element so as to drive the optical wavelength response to a predetermined wavelength;

wherein the temperature controller drives the optical wavelength response in accordance with a linearized model of the optical device;

the optical wavelength response of the optical component is substantially equal to the first predetermined wavelength at a first effective temperature of the optical component; and

the temperature controller

is capable of estimating global temperature ($\underline{T_e}$) of the optical component based on (i) one or more temperature indications received from the temperature-sensing element, (ii) the power dissipated by the heating element, and (iii) the rate of increase in the indications of temperature with the power dissipated in the heating element during stable thermal state;

is capable of determining a set-point to which the temperature controller drives temperature indications of the temperature-sensing element by

computing a difference between the first effective temperature and the estimate of the global temperature of the optical component,

computing a ratio of the first thermal constant to the second thermal constant,

computing a product of the difference and the ratio, and

adding the product to the estimate of the global temperature to obtain the set-point.

30. (original) A method in accordance with claim 29, wherein the optical component comprises an interferometric optical filter comprising multiple optical paths of unequal lengths.

31. (original) A method in accordance with claim 29, wherein the optical component comprises an arrayed waveguide grating.

32. (original) A method in accordance with claim 31, wherein providing a heating element comprises providing an efficient patterned heater.

33. (original) A method in accordance with claim 31, wherein providing a heating element comprises providing a first patterned thin conductive film disposed on the arrayed waveguide grating.

34. (original) A method in accordance with claim 31, wherein providing a temperature-sensing element comprises providing a second patterned thin conductive film disposed on the arrayed waveguide grating.

35. (original) A method in accordance with claim 34, wherein providing a first patterned thin conductive film comprises providing a first patterned thin conductive film made from a first material, and providing a second patterned thin conductive film comprises providing a patterned thin conductive film made from the first material.

36. (currently amended) A method in accordance with claim 29, wherein:

wherein the first heating element comprises a first efficient patterned grating ~~the optical wavelength response of the optical component is substantially equal to the first predetermined wavelength at a first effective temperature of the optical component; and~~

~~the temperature controller~~

~~is capable of estimating global temperature (T_e) of the optical component based on (i) one or more temperature indications received from the temperature-sensing element, (ii) the power dissipated by the heating element, and (iii) the rate of increase in the indications of~~

~~temperature with the power dissipated in the heating element during stable thermal state;~~

~~is capable of determining a set-point to which the temperature controller drives temperature indications of the temperature-sensing element by~~

~~computing a difference between the first effective temperature and the estimate of the global temperature of the optical component,~~

~~computing a ratio of the first thermal constant to the second thermal constant,~~

~~computing a product of the difference and the ratio, and~~

~~adding the product to the estimate of the global temperature to obtain the set-point~~.

37. (currently amended) A method for temperature-stabilizing an optical component of an optical device, the optical component having an optical wavelength response that is a function of temperature of the optical component, the optical wavelength response being equal to a predetermined wavelength when the optical component is at a first effective temperature, the method comprising:

receiving indications of temperature from a temperature-sensing element on the optical device, the temperature-sensing element being capable of generating the indications of temperature at location of the temperature-sensing element; and

regulating power provided to a heating element on the optical device so as to drive effective temperature of the optical component to the first effective temperature, wherein regulating power comprises using a linearized model of the optical device wherein, at stable thermal state, effective temperature of the optical component increases at a first rate with increasing the power provided to the heating element, and the indications of temperature increase at a second rate with increasing the power provided to the heating element; wherein

the optical wavelength response of the optical component is substantially equal to the first predetermined wavelength at a first effective temperature of the optical component; and

the temperature controller

is capable of estimating global temperature ($\underline{T_e}$) of the optical component based on (i) one or more temperature indications received from the temperature-sensing element, (ii) the power dissipated by the heating element, and (iii) the rate of increase in the indications of temperature with the power dissipated in the heating element during stable thermal state;

is capable of determining a set-point to which the temperature controller drives temperature indications of the temperature-sensing element by

computing a difference between the first effective temperature and the estimate of the global temperature of the optical component,

computing a ratio of the first thermal constant to the second thermal constant,

computing a product of the difference and the ratio, and

adding the product to the estimate of the global temperature to obtain the set-point.

38. (original) A method according to claim 37, wherein the optical component comprises an arrayed waveguide grating.

39. (original) A method according to claim 38, wherein the optical device comprises an efficient patterned heater disposed on the arrayed waveguide grating.

40. (currently amended) A method for temperature stabilizing first and second optical components of an optical device, the first optical component having a first optical wavelength response that is a function of temperature of the first optical component, the first optical wavelength response being equal to a first predetermined wavelength when the first optical component is at a first effective temperature, the second optical component having a second optical wavelength response that is a function of temperature of the second optical component, the second optical wavelength response being equal to a second predetermined wavelength when the second optical component is at a second effective temperature, the method comprising:

receiving first indications of temperature from a first temperature-sensing element on the optical device disposed proximate the first optical component, the first temperature-sensing element being capable of generating the first indications of temperature at location of the first temperature-sensing element,

regulating first power provided to a first heating element disposed on the optical device proximate the first optical component so as to drive effective temperature of the first optical component to the first effective temperature, wherein regulating first power comprises using the first indications of temperature in a first feedback control loop to set the first power in accordance with a linearized model of the optical device;

receiving second indications of temperature from a second temperature-sensing element on the optical device disposed proximate the second optical component, the second temperature-sensing element being capable of generating the second indications of temperature at location of the second temperature-sensing element; and

regulating second power provided to a second heating element disposed on the optical device proximate the second optical component so as to drive effective temperature of the second optical component to the second effective temperature, wherein regulating second power comprises using the second indications in a second feedback control loop to set the second power in accordance with the linearized model of the optical device;

wherein the linearized model provides that, at stable thermal state, effective temperature of the first optical component increases at a first rate with increasing the first power, the first indications of temperature increase at a second rate with increasing the first power, effective temperature of the second optical component increases at a third rate with increasing the second power, and the second indications of temperature increase at a fourth rate with increasing the second power;

the optical wavelength response of the optical component is substantially equal to the first predetermined wavelength at a first effective temperature of the optical component; and

the temperature controller

is capable of estimating global temperature (T_e) of the optical component based on (i) one or more temperature indications received from the temperature-sensing element, (ii) the power dissipated by the heating element, and (iii) the rate of increase in the indications of

temperature with the power dissipated in the heating element during stable thermal state;

is capable of determining a set-point to which the temperature controller drives temperature indications of the temperature-sensing element by

computing a difference between the first effective temperature and the estimate of the global temperature of the optical component,

computing a ratio of the first thermal constant to the second thermal constant,

computing a product of the difference and the ratio, and

adding the product to the estimate of the global temperature to obtain the set-point.

41. (original) A method according to claim 40, wherein the first optical component comprises a first arrayed waveguide grating and the second optical component comprises a second arrayed waveguide grating.

42. (original) A method according to claim 41, wherein the first heating element comprises a first efficient patterned grating.

43. (original) A method according to claim 40, wherein the first predetermined wavelength is equal to the second predetermined wavelength.

44. (currently amended) A method for temperature stabilizing first and second optical components of an optical device, the first optical component having a first optical wavelength response that is a function of temperature of the first optical component, the first optical wavelength response being equal to a first predetermined wavelength when the first optical component is at a first effective

temperature, the second optical component having a second optical wavelength response that is a function of temperature of the second optical component, the second optical wavelength response being equal to a second predetermined wavelength when the second optical component is at a second effective temperature, the method comprising:

receiving indications of temperature from a temperature-sensing element on the optical device disposed proximate the first optical component, the temperature-sensing element being capable of generating the indications of temperature at location of the temperature-sensing element,

regulating first power provided to a first heating element disposed on the optical device proximate the first optical component so as to drive effective temperature of the first optical component to the first effective temperature, wherein regulating first power comprises using the temperature indications in a feedback control loop to set the first power in accordance with a linearized model of the optical device; and

regulating second power provided to a second heating element disposed on the optical device proximate the second optical component so as to drive effective temperature of the second optical component to the second effective temperature, wherein regulating second power comprises using the indications of temperature and level of the first power in the linearized model of the optical device to set the second power;

wherein the linearized model provides that, at stable thermal state, effective temperature of the first optical component increases at a first rate with increasing the first power, the indications of temperature increase at a second rate with increasing the first power, and effective temperature of the second optical component increases at a third rate with increasing the second power;

the optical wavelength response of the optical component is substantially equal to the first predetermined wavelength at a first effective temperature of the optical component; and

the temperature controller

is capable of estimating global temperature (T_e) of the optical component based on (i) one or more temperature indications received from the temperature-sensing element, (ii) the power dissipated by the heating element, and (iii) the rate of increase in the indications of temperature with the power dissipated in the heating element during stable thermal state;

is capable of determining a set-point to which the temperature controller drives temperature indications of the temperature-sensing element by

computing a difference between the first effective temperature and the estimate of the global temperature of the optical component,

computing a ratio of the first thermal constant to the second thermal constant,

computing a product of the difference and the ratio, and

adding the product to the estimate of the global temperature to obtain the set-point.

45. (original) A method according to claim 44, wherein the first optical component comprises a first arrayed waveguide grating and the second optical component comprises a second arrayed waveguide grating.

46. (original) A method according to claim 45, wherein the first heating element comprises a first efficient patterned grating.

47. (original) A method according to claim 44, wherein the first predetermined wavelength is equal to the second predetermined wavelength.

48. (currently amended) A method for temperature stabilizing first and second optical components of an optical device, the first optical component having a first optical wavelength response that is a function of temperature of the first optical component, the first optical wavelength response being equal to a first predetermined wavelength when the first optical component is at a first effective temperature, the second optical component having a second optical wavelength response that is a function of temperature of the second optical component, the second optical wavelength response being equal to a second predetermined wavelength when the second optical component is at a second effective temperature, the method comprising:

receiving first indications of temperature from a first temperature-sensing element on the optical device disposed proximate the first optical component, the first temperature-sensing element being capable of generating the first indications of temperature at location of the first temperature-sensing element,

step for regulating first power provided to a first heating element disposed on the optical device proximate the first optical component so as to drive effective temperature of the first optical component to the first effective temperature, wherein the step for regulating first power comprises using the first indications of temperature in a first feedback control loop to set the first power in accordance with a linearized model of the optical device;

receiving second indications of temperature from a second temperature-sensing element on the optical device disposed proximate the second optical component, the second temperature-sensing element being capable of

generating the second indications of temperature at location of the second temperature-sensing element; and

step for regulating second power provided to a second heating element disposed on the optical device proximate the second optical component so as to drive effective temperature of the second optical component to the second effective temperature, wherein the step for regulating second power comprises using the second indications in a second feedback control loop to set the second power in accordance with the linearized model of the optical device; wherein

the optical wavelength response of the optical component is substantially equal to the first predetermined wavelength at a first effective temperature of the optical component; and

the temperature controller

is capable of estimating global temperature ($\underline{T_e}$) of the optical component based on (i) one or more temperature indications received from the temperature-sensing element, (ii) the power dissipated by the heating element, and (iii) the rate of increase in the indications of temperature with the power dissipated in the heating element during stable thermal state;

is capable of determining a set-point to which the temperature controller drives temperature indications of the temperature-sensing element by

computing a difference between the first effective temperature and the estimate of the global temperature of the optical component,

computing a ratio of the first thermal constant to the second thermal constant,

computing a product of the difference and the ratio, and

adding the product to the estimate of the global temperature to obtain the set-point.

49. (currently amended) A method for temperature stabilizing first and second optical components of an optical device, the first optical component having a first optical wavelength response that is a function of temperature of the first optical component, the first optical wavelength response being equal to a first predetermined wavelength when the first optical component is at a first effective temperature, the second optical component having a second optical wavelength response that is a function of temperature of the second optical component, the second optical wavelength response being equal to a second predetermined wavelength when the second optical component is at a second effective temperature, the method comprising:

receiving indications of temperature from a temperature-sensing element on the optical device disposed proximate the first optical component, wherein the temperature-sensing element is capable of generating the indications of temperature at location of the temperature-sensing element,

step for regulating first power provided to a first heating element disposed on the optical device proximate the first optical component so as to drive effective temperature of the first optical component to the first effective temperature, wherein the step for regulating first power comprises using the temperature indications in a feedback control loop to set the first power in accordance with a linearized model of the optical device; and

step for regulating second power provided to a second heating element disposed on the optical device proximate the second optical component so as to drive effective temperature of the second optical component to the second effective temperature, wherein the step for regulating second power comprises

using the indications of temperature and level of the first power in the linearized model of the optical device to set the second power; wherein

the optical wavelength response of the optical component is substantially equal to the first predetermined wavelength at a first effective temperature of the optical component; and

the temperature controller

is capable of estimating global temperature ($\underline{T_e}$) of the optical component based on (i) one or more temperature indications received from the temperature-sensing element, (ii) the power dissipated by the heating element, and (iii) the rate of increase in the indications of temperature with the power dissipated in the heating element during stable thermal state;

is capable of determining a set-point to which the temperature controller drives temperature indications of the temperature-sensing element by

computing a difference between the first effective temperature and the estimate of the global temperature of the optical component,

computing a ratio of the first thermal constant to the second thermal constant,

computing a product of the difference and the ratio, and

adding the product to the estimate of the global temperature to obtain the set-point.

50. (currently amended) An integrated optical device comprising:

an optical component having an optical wavelength response that is a function of temperature of the optical component, the optical component comprising an interferometric optical filter comprising multiple optical paths of unequal lengths, the interferometric optical filter comprising an arrayed waveguide grating; and

a means for adjusting the temperature of the optical component by dissipating power in the optical component, wherein the power dissipated is determined using at least one linearized function of at least one of the effective temperature of the optical component or indications of temperature of the optical component, wherein:

indications of temperature generated by the temperature adjusting means during stable thermal state of the optical device vary as a first substantially linear function of the power dissipated;

effective temperature of the optical component during stable thermal state varies as a second substantially linear function of the power dissipated;

the first substantially linear function is characterized by a first thermal constant $(\frac{dT_r}{dW})$ that is the rate of increase in the indications of temperature with the power dissipated;

the second substantially linear function is characterized by a second thermal constant $(\frac{dT_\lambda}{dW})$ that is the rate of change in the optical wavelength response with the power dissipated;

the temperature adjusting means is capable of estimating global temperature (T_e) of the optical component during a first period based on (i) one or more temperature indications received during the first period, (ii) the power dissipated during the first period, and (iii) the first thermal constant;

the optical wavelength response of the optical component is substantially equal to the predetermined wavelength at a first effective temperature of the optical component; and

the temperature adjusting means is capable of determining a set-point to which the temperature controller drives temperature indications during a second period that follows the first period by

computing a difference between the first effective temperature and the estimate of the global temperature of the optical component during the first period,

computing a ratio of the first thermal constant to the second thermal constant,

computing a product of the difference and the ratio, and

adding the product to the estimate of the global temperature of the optical component during the first period to obtain the set-point.

51. (currently amended) An integrated optical device comprising:

a first optical component having a first optical wavelength response that is a function of temperature of the first optical component, the optical component comprising an interferometric optical filter comprising multiple optical paths of unequal lengths, the interferometric optical filter comprising an arrayed waveguide grating;

a second optical component having a second optical wavelength response that is a function of temperature of the second optical component; and

at least one means for adjusting the temperature of the first optical component and the second optical component by dissipating power in the first optical component and the second optical component, wherein the power

dissipated by each means for adjusting the temperature is determined using at least one linearized function of at least one of the effective temperature of the optical component or indications of temperature of the optical component, wherein:

indications of temperature generated by the temperature adjusting means during stable thermal state of the optical device vary as a first substantially linear function of the power dissipated;

effective temperature of the optical component during stable thermal state varies as a second substantially linear function of the power dissipated;

the first substantially linear function is characterized by a first thermal constant $(\frac{dT_r}{dW})$ that is the rate of increase in the indications of temperature with the power dissipated;

the second substantially linear function is characterized by a second thermal constant $(\frac{dT_\lambda}{dW})$ that is the rate of change in the optical wavelength response with the power dissipated;

the temperature adjusting means is capable of estimating global temperature (T_e) of the optical component during a first period based on (i) one or more temperature indications received during the first period, (ii) the power dissipated during the first period, and (iii) the first thermal constant;

the optical wavelength response of the optical component is substantially equal to the predetermined wavelength at a first effective temperature of the optical component; and

the temperature adjusting means is capable of determining a set-point to which the temperature controller drives temperature indications during a second period that follows the first period by

computing a difference between the first effective temperature and the estimate of the global temperature of the optical component during the first period,

computing a ratio of the first thermal constant to the second thermal constant,

computing a product of the difference and the ratio, and

adding the product to the estimate of the global temperature of the optical component during the first period to obtain the set-point.